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*Full Length Research Paper*

# Service learning in pharmacy: Opportunities for student learning and service delivery

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**High patient load and understaffing in public health care facilities preclude the provision of optimal pharmaceutical services in South Africa. A Service Learning in Pharmacy (SLIP) programme for the University of the Western Cape's final year pharmacy students was implemented in health care facilities to assist in service provision. Students rotated between a pharmacotherapy (patient-oriented) and pharmaceutical formulation (product-oriented) activities to develop skills in prescription analysis, manufacturing and packaging of hospital pharmaceuticals. Structured focus group sessions were held with students and pharmacists to assess the integrated service learning experiences. Student feedback was positive, as the 'real world' experiences enabled them to adapt to intense work pressures, developed a sense of 'personal responsibility' towards patient health and they were sensitized to issues of social injustice. Students became competent in prescription analyses, counseling on medication use, manufacturing and pre-packing procedures. Pharmacists fully supported increased student involvement in the health services. Service learning in pharmacy schools is needed to contextualize learning and to address health care needs in South Africa.**

**Key words:** Pharmacotherapy, pharmaceutical formulation, undergraduate pharmacy training, public sector healthcare services, service learning.

## INTRODUCTION

Concerted efforts to address South Africa's (SA) reconstruction and development programme led to Higher Education Institutions (HEIs) exploring new models for community engagement (Department of Education, 1997). The Community Higher Education Service Partnerships (CHESP) initiative facilitated implementtation of community-based service learning programmes across academic institutions to address priority needs in underserved communities. In an attempt to achieve this goal, a Service Learning in Pharmacy (SLIP) programme between the University of Western Cape's (UWC) School of Pharmacy and the Department of Health (Western Cape) was conceived. This paper contextualizes the service learning programme within UWC's existing pharmacy training programme, the public health care service and the practice of pharmacy in the Western Cape province of South Africa. It underpins integration of a product-oriented and patient-oriented approach to undergraduate service learning pharmacy programmes, and its impact on pharmaceutical service delivery in the Western Cape province of South Africa.

### Undergraduate pharmacy training in South Africa

The undergraduate pharmacy curriculum spans four years, with the first two years focusing on theoretical concepts in basic and pharmaceutical sciences followed by theoretical application in the third and fourth year of

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**Table 1.** Exit level outcomes (1 to 11) stipulated for undergraduate pharmacy training in South Africa (South African Qualifications Authority, 2009).

| | |
|---|---|
| 1 | Integrate and apply foundational scientific knowledge and principles to pharmaceutical sciences |
| 2 | Apply integrated knowledge of product development and formulation in the compounding, manufacturing, distribution and dispensing of pharmaceutical products |
| 3 | Compound, manipulate and prepare medication in compliance with Good Pharmacy Practice (GPP), Good Manufacturing Practice (GMP) and/or Good Clinical Practice (GCP) guidelines |
| 4 | Manage and control the development, manufacture, packaging and registration of pharmaceutical products in compliance with GMP and GCP |
| 5 | Manage the logistics of selection, procurement, storage, distribution and disposal of pharmaceutical products |
| 6 | Dispense medication and ensure the optimal pharmaceutical care for a patient in compliance with Good Pharmacy Practice (GPP) |
| 7 | Apply a pharmaceutical care management approach to ensure rational medicine use |
| 8 | Initiate and/or modify therapy where appropriate, within the scope of practice of a pharmacist and in accordance with GPP and GCP |
| 9 | Promote public health |
| 10 | Integrate and apply management principles in the practice of pharmacy |

study. From their second year, undergraduate students register with the South African Pharmacy Council (SAPC) as pharmacist assistants, making them eligible to practice as trainees under a pharmacist's supervision. Fourth year students are required to complete eight core courses, a research project and an experiential learning programme to finalize undergraduate study (Undergraduate Calendar, 2009). At UWC, experiential learning consists of clinical 'bedside' teaching and a service learning programme, each conducted over two semesters and offers 7.5 of the 495 total credits required for attaining the Bachelor in Pharmacy degree.

Entry level pharmacists are required to fulfill South African Qualifications Authority's learner outcomes (Table 1) spanning across knowledge of the basic principles of pharmaceutical formulation, rational pharmacotherapy, dispensing and counseling to ensure optimal use of medicines (SAQA, 2009). Students are also required to integrate concepts across exit level outcomes to achieve competence that is grounded and coherent so that learning can be optimized. After completing a one-year internship and passing the pre-registration examination (regulated by the SAPC), a year of compulsory community service (regulated by the Department of Health) is required before full registration as a pharmacist with the SAPC.

## Health care and pharmacy practice in South Africa

The majority of South Africans, predominantly those from the low socio-economic areas, obtain health care from public sector facilities which strive towards equity in health care and rational prescribing practices (Department of Health Western Cape, 2007-2008). Chronic disease management remains a major challenge with poor understanding of pathophysiological concepts by healthcare professionals, inadequate patient knowledge and adherence to therapy leading to an increase in hospital admissions and high patient loads, which when combined with poor infrastructure, and a lack of adequate medical and pharmaceutical supplies often hinders optimal service delivery (Haque et al., 2005).

In the Western Cape, most patients receive chronic care from primary level Community Health-care Centres (CHCs) which relieve patient load on tertiary level hospitals that focus on offering specialized care (Vlok, 2000) (Table 2). Since public sector facilities provide care to approximately 3.6 million patients, with only 15 pharmacists employed per 100 000 patients (Department of Health Western Cape), the increasing workload in understaffed facilities compromises optimal service delivery.

Due to the organizational structure of the South African public health care service sector, pharmacists have remained peripheral in the primary care team (Gilbert, 1998). They have minimal direct contact with patients; therefore, the opportunity to provide patient-centered care remains non-existent, thereby undermining the primay care concept. Most pharmacists opt for

**Table 2.** Outline of health care and pharmaceutical services offered at tertiary level hospitals and Community Health-care Centres (CHCs) of the Western Cape.

| | **Tertiary (academic) hospitals** | **Community Health-care Centres (CHCs)** |
|---|---|---|
| Health care service offered | Specialized care. | Primary health care -offering preventive and curative services.<br>Centers are located closest to the patient, thus providing first contact care. |
| Pharmaceutical service offered | | |
| Product-oriented | Bulk manufacturing, compounding and pre-packing of hospital pharmaceuticals. | Small scale pre-packing |
| Patient-oriented | Pharmaceutical care offered in specialized care units.<br>Pharmacotherapeutic management of chronic diseases at out-patient dispensary. | Pharmacotherapeutic management of chronic diseases at out-patient dispensary. |

favourable working conditions and better remuneration packages in the private sector, resulting in rapid staff turnover, under-staffing with increased workload and a high (56%) vacancy rate in the public sector (South African Pharmacy Council, 2006).

Service learning is a credit bearing experiential learning program that aims to link academic study with service provision (Eyler and Giles, 1999). Students engage in structured and organized service activities that address priority community needs. By reflecting on these 'real life' experiences, self-directed and contextualized learning is achieved. A triad partnership between the services, academic institution and the community is cornerstone to service learning programmes, while most South African pharmacy training programmes focus on clinical and 'bedside teaching', undergraduate service learning programmes are yet to be conducted in health care facilities.

There are several differences between clinical training and service learning programmes (Seifer, 2002). In clinical training, student learning is the primary objective wher the focus is on acquiring knowledge and technical skills by observing and physically performing the skills. The role of faculty, student and patient is defined, and faculty is responsible for curriculum design. In contrast, service learning attempts to balance service and learning opportunities, where the learning is student-focused and community-focused and reflection is essential. The roles of faculty, teacher and learner are intentionally blurred and students focus on issues of social injustice where the social, political, economic and cultural context is taken into consideration.

Since pharmacy is a profession which incorporates basic science education, including an understanding of pharmaceutical formulation concepts, to application of pharmacotherapeutic concepts, an undergraduate service learning programme could serve as a platform for active learning. By assisting in pharmaceutical compoundding, pre-packing and dispensing of medication, it would enable students to apply theoretical concepts relating to product formulation and pharmacotherapy within an existing health service, where students could examine the relevance of campus teaching.

## IMPLEMENTATION OF SERVICE LEARNING IN THE SCHOOL OF PHARMACY

A participatory approach was used in the school's service learning implementation programme. The UWC-CHESP initiative led to the establishment of a partnership between the School of Pharmacy and the Pharmaceutical Services, Department of Health, Western Cape to identify priority needs. Academic staff from the pharmaceutics and pharmacology disciplines held preliminary discussions with senior pharmacy service partners to identify learning objectives that would be of mutually beneficial to the health services, patients and students. The aim of the SLIP was to enable students to provide a service, and upon reflecting, derive learning from those experiences.

Since SLIP was the school's first engagement with the pharmaceutical services, it was necessary to introduce it in piecemeal fashion, where it could be comfortably managed at the sites (Appendix 1). Partnerships were strengthened and logistical problems that were encountered were addressed before a new site was recruited. Skills development to meet the pharmaceutical

product-centered competencies (SAQA, 2009) in practice was considered only after implementation of the pharmacotherapy component, because pharmacists indicated that students could easily be supervised at the dispensary. Pharmacy staff synchronized service activities with student group visits to vary the learning experiences, while meeting patient health care needs. Structured learning objectives relating to hospital pharmaceutical production (product-oriented) and pharmacotherapy (patient-oriented) were identified.

**Pharmacotherapy**

Prior to the implementation of SLIP, pharmacotherapy at the fourth year was taught as a problem based learning (PBL) module, with student groups analyzing clinical scenarios and identifying appropriate treatment options under supervision of academic staff. Role-playing was used to simulate patient-pharmacist interactions and an objective structured clinical examination (OSCE) checklist was used to assess student performance (de Vries et al., 1994). This PBL pharmacotherapy module was subsequently adapted into a service learning component, where pharmacotherapeutic principles could be applied in the "real world" where students could engage directly with patients at five CHC pharmacies (2002). The main objectives were to develop skills in prescriptions analysis in accordance with therapeutic guidelines and to promote healthy living among patients (Table 3).

**Pharmaceutics**

Pharmaceutics, a product-centered discipline is taught through didactic lectures and weekly practicals on campus. It focuses on pharmaceutical technology, adherence to good practices in compounding, manufacturing and packaging, and the procurement and safe disposal of pharmaceutical products. The pharmaceutics component of service learning which was not adapted from any existing on-campus module was piloted at the Cape Medicine Depot (2005), a pharmaceutical pre-packing, storage and distribution centre for public sector hospitals (Appendix 1). Student activities focused on familiarity with large-scale stock procurement, pre-packing, distribution and quality assurance procedures, with the main objective the identification of adherence to regulatory requirements. By applying these scientific principles in a real practice setting, students could be alerted to the stringent procedures that are adhered to before a patient actually receives the prescribed medication.

Students could not be rotated between the pharmacotherapy and pharmaceutics sites, because of constraints within the academic time-table. At post-implementation, qualitative feedback sessions revealed that that learning was largely discipline-specific and primarily confined to isolated experiences. Students indicated that the depot visits were "mundane and tedious" and largely "limited to storekeeping". Since there was no engagement with patients, students could not easily connect product-oriented concepts to addressing any therapeutic need, leading to fragmented learning. At the CHCs, students found that the *modus operandi* of "mechanical dispensing" further precluded opportunities for inter-disciplinary learning. Academic staff reiterated that a holistic pharmaceutical learning approach was essential for students to integrate concepts, where a continuum of service activities could be accommodated. Consequently, an integrated service learning programme incorporating pharmacotherapy and pharmaceutics components (2006) were implemented (Table 3).

**SLIP: Product-oriented and patient-oriented integration**

In preparation for integrated service learning, the on-campus PBL sessions included case scenarios depicting 'real-life' situations pertaining to drug therapy, treatment adherence, medication packaging, labeling and storage. Two tertiary level hospitals, one specializing in paediatric care and the other in adult chronic diseases, created opportunities for product-centered and patient-centered services (Figure 1). UWC-contracted facilitators or the on-site pharmacists supervised students in their activities in the pharmacy and at the wards. In the pharmacy, students rotated internally between the manufacturing and packaging units and the dispensary, where possible students were also exposed to the principles of manufacturing and the administration of specialized medication required for chemotherapy and total parenteral nutrition.

***Student assessments***

Quantitative student assessments were conducted on-site and on campus. On-site checklists consisted of a dispensing checklist (OSDE, Appendix 2) and a pharmaceutics checklist to assess adherence to standard operating procedures during product formulation and packaging (Appendix 3). The checklists were designed for prompt assessment of core competencies. On-campus assessments consisted of analysis of PBL case scenarios and reflective reports. Students were required to submit weekly reflective reports focusing on their learning experiences from patient and staff interactions, and their ability to apply theoretical concepts in practice.

Quantitative assessments (and their allocated weighting) consisted of class averages from PBL exercises (30%), on-site OSDE checklist (30%), practice-based tests (20%) and weekly reports (20%), are

**Table 3.** Service learning framework for integration of pharmacotherapy and pharmaceutics components (2006).

| | **Pharmacotherapy** | **Pharmaceutics** |
|---|---|---|
| Campus based teaching method | Problem-based learning using role-playing simulations | Didactic lectures, laboratory practicals |
| **Integration of service learning** | | |
| Service learning sites | Tertiary level hospitals<br>Community health-care Centres | Tertiary level hospitals |
| Service learning activities | Assess prescriptions.<br>Counsel patients on appropriate medicine use and promote preventive care. | Compound, label, pre-pack<br>hospital pharmaceuticals<br>Rotate stock and check adherence to storage conditions |
| Focus of care provision | Patient-centered | Product-centered |
| **Objectives for each partner** | | |
| Students | Develop competence in prescription assessment and therapeutic counseling on appropriate medicine use in accordance with treatment guidelines.<br>Promote preventive care. | Develop skills in adherence to standard operating procedures during pharmaceutical manufacturing and packaging for different products.<br>Understand quality control assessment procedures to ensure medicine stability |
| Pharmacists/ Facilitators | Facilitate and assess skills development in pharmacotherapy | Facilitate and assess application of the principles of good manufacturing and packaging practices. |
| Patients | Understand appropriate medication use in chronic disease management. | Understand quality and safe medicine use. |
| **Student assessments** | | |
| Onsite checklist for service learning activity | Objective structured dispensing examination (OSDE, Appendix 1). | Adherence to standard operating procedures for GMP, packaging<br>(Appendix 2). |
| **On campus: Integrated assessments** | | |
| PBL | Assess appropriateness of pharmacotherapy for common clinical cases. Analyze problems encountered during formulation and packaging of hospital pharmaceuticals. | |
| Reflective reports | In-depth discussion of experiences with patients and site staff, adherence to SOP for pharmaceutical compounding and packaging | |
| Feedback on SLIP integration conducted with pharmacists and students | | |

summarized in Table 4. Overall, the average OSDE score was found to be higher across the CHCs (76.6%) as compared to that with the hospitals (70.1%). At hospitals, more intensive therapeutic regimens are prescribed which require greater scrutiny as compared to those in the CHCs. Across both types of facilities, there was a slight increase in score from session 1 to session 2, with a drop in performance in the final session which

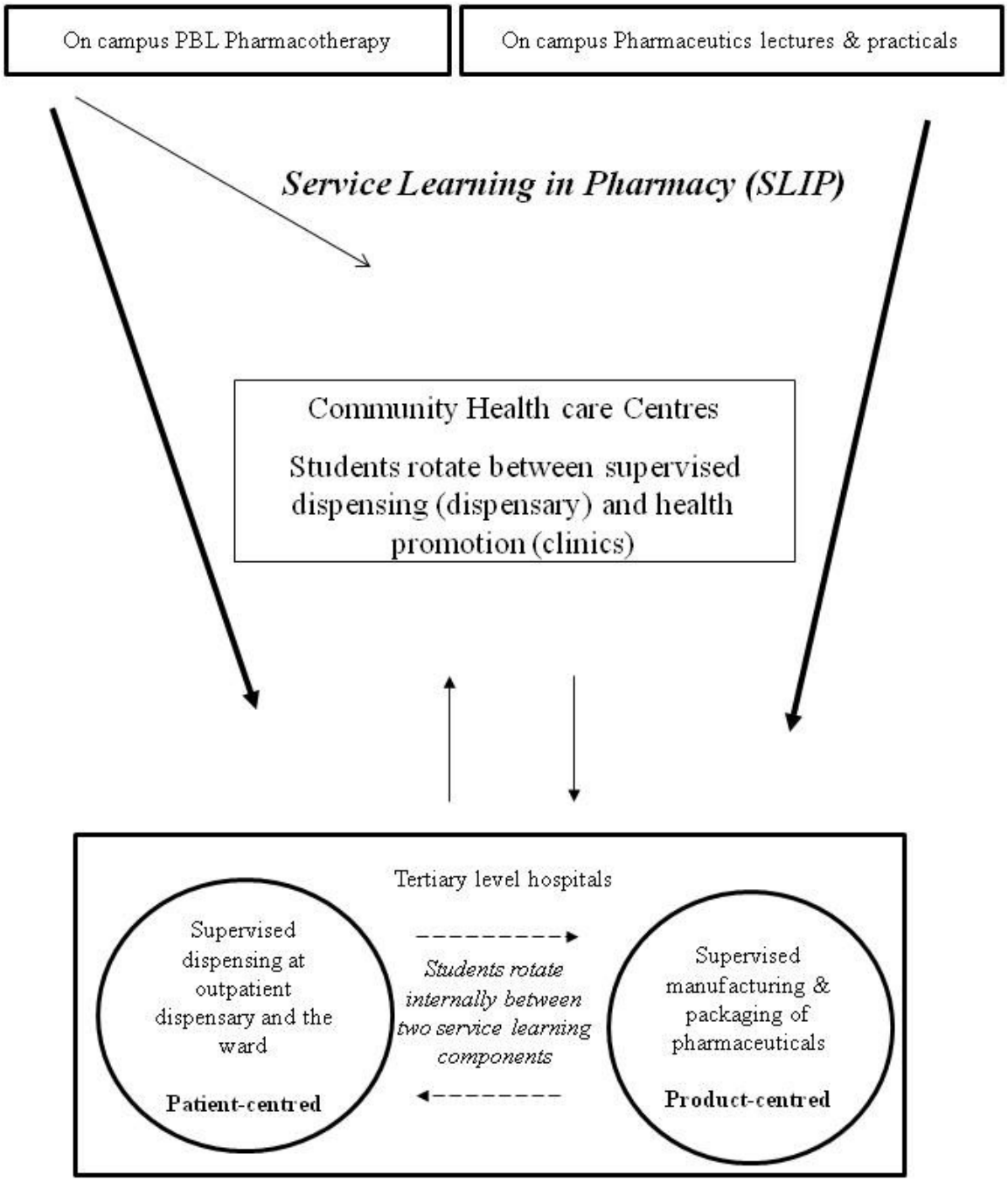


**Figure 1.** Schematic representation of integration of pharmacotherapy and pharmaceutics service learning components at tertiary level hospitals.

could be due to time limitations. The high OSDE class average (72.9%) indicates that the students ac-quired dispensing skills. For pharmaceutics, over a third of the class engaged in compounding and packaging, achieving high averages (83 and 79%), respectively.

Open-book practice-based tests were conducted before and after the service-learning sessions focusing on pharmacotherapy and pharmaceutics-based activities. The main objective was to test their ability to critically analyze contextual factors that influence care provision and apply theoretical concepts in scenarios that mi-micked 'real life' situations. In practice, pharmacists have access to a plethora of reference material which assists them in their decision-making. An open book test clearly mimics this practice role and it evaluates students' ability to access pertinent information that would be applicable

**Table 4.** Quantitative student assessments 2007 (*n = 72).

| On campus | Class average (%) | Overall class average (%) | Final class average (weighted) (%) |
|---|---|---|---|
| **Problem-based learning (PBL)** | | 70.0 | 21 |
| P-drug worksheets | 67.6 | | |
| OSCE | 71.4 | | |
| | | | |
| **Service-learning** | | | |
| On-site assessments | | | |
| OSDE | | 72.9 | 22 |
| | | | |
| **Pharmaceutics** | | 81 | |
| Compounding (n=24) | 83 | | |
| Packaging (n=29) | 79 | | |
| | | | |
| **Structured reflective reports** | | 53.3 | 11 |
| Session 1 | 45.4 | | |
| Session 2 | 50.6 | | |
| Session 3 | 63.8 | | |
| | | | |
| **Practice-based tests (open-book)** | | 46 | 9 |
| Test 1 | 33.1 | | |
| Test 2 | 58.8 | | |

*Class size of 72 unless otherwise specified.

to a case, thereby developing their analytical skills.

The first open-book test was conducted two weeks after the first service-learning session (May, 2007); two weeks later, students received feedback from an independent evaluator about their performance, the second test followed two weeks after the service-learning sessions had ended (October, 2007). The low class average in the first open-book test (33%) was expected, but a subsequent improvement in the second test (59%) was noted. Students agreed that the evaluator's feedback after the first test enabled them to analyze the scenarios more carefully, become more aware of contextual factors and develop skills to integrate learning.

The structured weekly report aimed to develop the student's reflective thinking ability. The main purpose was to determine whether the pharmacotherapeutic and pharmaceutical activities that they had engaged in, contributed to their professional and personal development. Reflective writing requires profound insight into an understanding of contextual factors that impact on service delivery, and in processing interpersonal issues and challenges. To avoid assessment bias, a facilitator other than the one assigned to the site where the student had attended, assessed the written report. In the event of a mark discrepancy, academic staff independently evaluated the report and arrived at a consensus. Though, the overall class average for the reflective report writing was over 50% where there was a gradual increase in class average from the first (45%) to the second (64%). The introduction of service learning much earlier in the formative years is essential to improve cognitive skills development.

The impact of SLIP on student learning was determined from pre-test and post-test questionnaire surveys to determine if module objectives and expectations were met. The aim of the surveys were to determine students' understanding of service-learning, their perceptions of the service and community outcomes and guidelines provided to them before site sessions. The pre-test was conducted a month (February, 2007) before students started the first service-learning session and the post test was conducted 3 weeks after the last session (October, 2007). Student responses (%) were analyzed using EPI-info. A smaller Likert scale was used as definitive answers were required from the students.

Students could identify key concepts of service-learning. At pre-test, over half of the class believed that service-learning entailed application of theoretical concepts (58%), while less than a fifth (14.5%) understood it to entail out of school learning. At post-test, a third (37%) perceived service-learning to entail theoretical applications, while there was a twofold increase among those who viewed it as out of school learning (31%), and some perceived it as service to the community (15%).

One of the key indicators used to assess the effectiveness of SLIP is whether students could apply theoretical concepts in practice settings. Over three-quarters of the class said that service-learning enabled them achieve theoretical application (80%). Even though there was a decrease in response to whether the module had met their expectations, half the class (post-test, 52%) believed that learning outcomes were achieved, while the remainder felt that it was partially achieved (47%). Overall, these findings indicate that while the SLIP module had met the learning outcomes, disparities around actual classroom teaching and 'real world' experiences seem to emerge.

One of the key aims of SLIP was to improve service delivery. Prior to site visits, the entire class perceived that the module was not likely to improve the services (pre-test 99%), but a change in perception occurred with over a quarter, indicating that the module did contribute towards service improvement (post test, 29%). Half the class indicated that the intended services outcomes was achieved (52%), while a third (38%) believed that this was partially so. Community outcomes serve as a valuable indicator of service learning and less than half of the class viewed that these were achieved (47%), while an equivalent proportion felt that this was partially so (43 %). Students' active involvement at understaffed public sector pharmaceutical facilities could help bridge the gap in service provision to help meet the community's therapeutic needs.

Orientation is essential to familiarize students with procedures and learning objectives, while most students indicated they had not received sufficient guidelines prior to site placements (89%), only a quarter of the students retained this view at post-test (28.5%). The decreased negativity could be largely attributed to students making sense of site activities and requirements once visits commenced.

The paired t-test analysis (level of significance, $P < 0.05$) showed varied findings for some assessment parameters (Table 5). With regard to students' understanding of service learning, there was a significant increase in believing that it was out of school learning (16.4%, $P = 0.000007$) and that it entailed theoretical application (22.39%, $P = 0.000002$). However, a significant 31.67% decrease ($P = 0.0000004$) to service learning meeting their expectation that it entailed knowledge application may be attributed to the absence of weekly group reflection to fully explore the behavioral, attitudinal and cultural differences, along with disparities in health services across ambulatory care settings.

Even though there was an increased understanding that service learning was an opportunity to provide a service to the community (13.43%, $P = 0.07$), student expectations, however, showed a significant decline with respect to learning from the community (15.79%, $P = 0.0002$) and the service staff (20%, $P = 0.000025$). This may be explained by the fact that students viewed the facilitators primarily as their source of individualized learning, since their community interaction was limited to only a few minutes during dispensing. With a focus on providing a professional service, students may have minimized their attention to the social aspects to care provision, while student responses showed a significant decrease to service learning preparing them for future work (12.96%, $P = 0.005$). This finding differed from the positive feedback obtained during the focus group discussion and the pharmacist intern survey. Student expectations that service learning contributed to their personal development showed a significant decrease (12.5%, $P = 0.005$). This is in contrast to pharmacists' perceptions that increased service learning exposure led to professional development. Lack of congruence probably arose from the limited time spent at each site where students may not have been able to adequately internalize the fast operational pace and may have been unable to process the social, civic and ethical responsibilities simultaneously under practice constraints. The transition from being passive recipients of didactic classroom teaching to 'real world' experiential learning requires scheduled reflection to consolidate experiences that go beyond discipline-based learning.

### *Feedback on the integrated SLIP programme*

Structured focus group discussions were held annually with students, academic staff and pharmacists to obtain feedback on the integrated SLIP programme. Students indicated that the learning experience inculcated a sense of personal responsibility. This became evident during reflection (student 22)

"…..*in ensuring that the [hospital] product available to the patient is safe and appropriate, as I prepared it by following the standard operating procedures outlined at the hospital. I had to make sure that the measurements and calculations were correct because I knew that it was going to be used by a patient…. It seemed different from doing a pharmaceutics practical on campus because of the large quantities that we had to make for the hospital*."

From this "hands on" active learning experience, students claimed to have gained a more meaningful understanding of their discipline-based courses taught on campus. Reflective comments indicated that (Student 10):

"*I could apply theoretical principles learnt from campus for pharmaceutics, pharmacy practice and pharmacotherapy". It seemed relevant as I could see how they all fitted in with what is taught in class. This [experience] made it easy to see how these subjects all tied in together, even though we might have limited time to do some of them.…When dispensing the medicines to*

**Table 5.** Paired t-tests:

| Parameter | | | Change from pre-test | P value | Significant (S) and not significant (NS) |
|---|---|---|---|---|---|
| Student understanding of service learning | Out of school learning | 16.4% | Increase | 0.000007 | S |
| | Application of theory | 22.39% | Increase | 0.000002 | S |
| | Service to community | 13.43% | Increase | 0.07 | NS |
| | Application of theory and service to community | 11.59% | Decrease | 0.067 | NS |
| Student expectations of service learning module (SLIP) | Learn from the community | 15.79% | Decrease | 0.0002 | S |
| | Learn from service staff | 20% | Decrease | 0.000025 | S |
| | Apply knowledge acquired | 31.67% | Decrease | 0.0000004 | S |
| | Assist in preparing for future work | 12.96% | Decrease | 0.005 | S |
| | Contribute to personal development | 12.5% | Decrease | 0.005 | S |
| | Requires more work than other modules | 23.08% | Decrease | 0.00000038 | S |
| Student view on module achieving learning outcomes | | 11.43% | Increase in positive response | 0.005 | S |
| Student view on receiving guidelines for working in the community | | 40.35% | Increase in positive response | 0.000000001 | S |

level of significance $P < 0.05$.

*patients, pharmacists also asked me questions-on- the- spot, so I had to know my pharmacology, and when I did not know the answer, I had to go and read it up."*

Students were in agreement that repeated experiences increased their confidence, thereby preparing them for the workplace. Some students even considered a pharmacy career in public sector facilities, since most of them were mainly exposed to experiences from community pharmacies where they fulfilled their 2nd and 3rd year practical training requirements. They added that the tertiary level hospitals offer a stimulating learning environment and that these experiences have changed their previously held negative views about working in a public hospital.

From focus group discussions, the main concern for students was that patient-centered care was not fully achieved in the community healthcare centres when compared with their experiences in private sector community pharmacies. Due to staff constraints, "less than one-minute" encounters when dispensing medication to patients did not allow for meaningful engagement to explore issues of treatment adherence. Even though, students were sensitized to issues of social injustice, such as language barriers, stigma associated with TB and HIV, gender inequality and unemployment which impact negatively on treatment adherence, these remained largely unexplored.

In training students to become custodians of medicines where health-related and medicine related risks should be identified and addressed within existing health service infrastructures, pharmacy training institutions and the public health services would need to work collaboratively to uphold their social contract and not exclusively deliver curricular content (Williams, 2007; Berger, 2009). In order to achieve social responsiveness as one of the graduate attributes, infrastructural and operational changes are required within the public sector pharmaceutical services to promote joint decision-making with patients so that planned treatment adherence strategies which are corner-stone to chronic disease management, can be implemented in the primary health care system. Collaboration with local community organizations are needed to identify priority health needs and assess resource requirements to consolidate the triad partnership between the school, services and the community.

Pharmacists felt that the piecemeal implement-

tation of service learning allowed for gradual changes to structure activities within the workplace. Even though understaffing at most sites precluded pharmacists from facilitating students, it enabled students to become self-reliant. Pharmacists believed that partnerships between the school and the pharmacy services were strengthened on the basis of reciprocity, one of the key tenets of service learning. Students undertook production of hospital pharmaceuticals, dispensed and counseled patients on treatment adherence and preventive care approaches. Service partners felt that they benefitted from students as they alleviated some of the workload, thereby contributing positively to service delivery. Initial challenges ranged from lack of communication among pharmacy staff to limited workspace within the pharmacy. At some sites, senior management did not inform service staff about the students' scheduled visits, leading to lack of preparedness. Some service staff seemed to resist student presence, indicating that concerted time and effort is required to supervise students, adding strain to their intensive workload. Part of this resistance could be attributed to staff having to re-arrange some of their current practice patterns to accommodate student learning.

## CONCLUSION

Service learning in undergraduate pharmacy is at its evolutionary stage in South Africa. Partnerships with the Department of Health provided the platform to integrate of product-oriented and patient-oriented services which helped students to concretize application of pharmaceutical concepts. Commitment from the service and academic staff are needed to institutionalize service learning in the undergraduate pharmacy curriculum. Regular monitoring and evaluation of the integrated service learning programme is needed to assess quality improvement.

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## REFERENCES

Berger BA (2009). Patient-centred care: it's about time. Am. J. Pharm. Educ., 73(5): 91.

Department of Education (1997). White Paper 3. A programme for Higher Education Transformation, Pretoria, Republic of South Africa.

Department of Health Western Cape (2007-2008). Report accessed February 2010: http://www.capegateway.gov.za/Text/2009/2/wc_dept_health_annual_report_2007_2008

de Vries TPGM, Henning, RH, Hogerzil HV, Fresle DA (1994). World Health Organisation, Guide to Good Prescribing. A practical manual. Action programme on Essential drugs. Geneva, pp. 1-100

Eyler J, Giles DE (1999). Where's the learning in service-learning? Josey Bass Publishers, San Francisco.

Gilbert L (1998). Pharmacy's attempts to extend its roles: a case study in South Africa. Soc. Sci. Med., 47(2): 153-164.

Haque MS, Emerson SH, Dennison CR, Navsa M, Levitt NS (2005). Barriers to Initiating insulin therapy in patients with type 2 diabetes mellitus in public-sector primary Health care centres in Cape Town. S. Afr. Med. J., 95: 798-802.

Seifer SD (2002). From placement site to partnership. The promise of service-learning. J. Nurs. Educ. October, 41: 10.

South African Pharmacy Council (2006) Office of the Registrar. Council embarks on an innovative HR plan for Pharmacy Pharmaciae. Pretoria. September: 14(2).

South African Qualifications Authority SAQA (2009). Registered qualification: Bachelor of Pharmacy. Qualification ID 65130.

Undergraduate Calendar (2009). Faculty of Science. University of the Western Cape Bellville, Cape Town, South Africa.

Vlok ME (2000). Manual of Community Nursing and Communicable Diseases. A textbook for South African students. Juta. Kenwyn. Cape Town.

Williams KF (2007). Re-examining 'professionalism' in pharmacy: A South African perspective. Soc. Sci. Med., 64: 1285-96.

## APPENDIX

**Appendix 1.** Stepwise implementation of pharmacotherapy (2002 to 2006) and pharmaceutics components into SLIP (2005 top 2006).

| **Scheduled visit** | **8 h 30 min – 11 h 30min on Tuesdays, Wednesdays and Thursdays** | | | |
|---|---|---|---|---|
| **Pharmacotherapy** | | | | |
| Year | 2002 | 2003 - 2004 | 2005 | 2006 |
| Second semester: Month implemented | Pilot: August to Mid-October | September - October | Mid-July to Mid-September | Mid-July to Mid-September |
| Duration (weeks) | 6 | 8 | 8 | 8 weeks |
| Sites: No. of CHCs | 5 | 6 | 5 | 3 |
| Supervision | Facilitators | Facilitators | Facilitators | Facilitators |
| Academic hospital | - | - | 1 | 1 |
| Supervision | - | - | Facilitators | Facilitators |
| No. of contracted facilitators | 5 | 6 | 5 | 3 |
| Total hours/student | 6 | 6 | 9 | 9 |
| No. of students/visit/site | 3 | 3 | 3 | 3 |
| **Pharmaceutics** | | | | |
| Second semester: Month implemented | - | - | Pilot: August - September | September - October |
| Duration (weeks) | | | 4 | 4 |
| No. of facilities | - | - | Cape depot | 2 academic hospitals |
| No. of contracted facilitators | - | - | 4 | 4 |
| Total hours/student | - | - | 6 | 6 |
| No. of students/visit/site | - | - | 3 | 3 |

**Appendix 2.** Objective structured dispensing examination (OSDE).

**Evaluates patient's therapy**

1. Correct reading of Rx
2. Defines the clinical condition(s)
3. Identifies inappropriate therapy/errors/dose complications/interactions or omissions.

**Dispenses the prescription**

1. Checks patient name ☐; folder # ☐; date ☐; dose ☐, total units ☐; directions ☐; warnings
2. Issues medication to patient.
a. Specifically states disease treatment objectives/goals
b. Lifestyle and health promotion
c. Gives advice on correct use and purpose of meds
i. Mentions drug and product names ☐
ii. Mentions how drug works ☐
iii. Mentions instructions/time for administration ☐
iv. Give advice on ADR ☐ special precautions ☐
v. Contraindications ☐
d. Assesses patient knowledge and recall
3. Student's communication style:
Greets point and establishes language to use ☐
Empathy ☐ Interaction ☐ Clear (audibility, pronunciation) ☐
Understandable ☐ Structures conversation (logical/ not jumping)
Encourages patient feedback
Ensure that the prescription is checked by the pharmacist.

**Appendix 3.** Pharmaceutics assessment.

| | Manufacturing | Packaging |
|---|---|---|
| 1. Applies GMP | | |
| 2. Adheres to SOP | | |
| 3. Checks for expired stock | | |
| 4. Cleans work area. Uses clean equipment, utensils | | |
| 5. Weighs ingredients accurately | | |
| 6. Keeps formulation ingredients together | | |
| 7. Checks for GLP | | |
| 8. Gains familiarity with QC tests | | |
| 9. Checks specifications and test results | | |
| 10. Calibrates and validates equipment | | |
| 11. Uses stock sheets | | |
| 12. Adheres to cold chain maintenance | | |
| 13 Checks physical appearance of product | | |
| 14. Adheres to appropriate labeling, packaging of material | | |

**Attitude**

Facilitator's overall impression: allocate a score (maximum 2) for each attribute:

1. Competence
2. Confidence
3. Participation
4. Suggestions
5. Overall impression